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Abstract

THE REPROCESSING OF IRRADIATED FUELS
IMPROVEMENT AND EXTENSION OF THE SOLVENT EXTRACTION PROCESS

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Improvements made in the conventional tri-butylphosphate process are described, in particular : the concentration and the purification of plutonium by one extraction cycle using tri-butyl-phosphate with reflux ; and the use of an apparatus working continuously for precipitating plutonium oxalate, for calcining the oxalate, and for fluorinating the oxide.

The modifications proposed for the treatment of irradiated uranium-molybdenum alloys are described, in particular, the dissolution of the fuel, and the concentration of the fission product solutions.

The solvent extraction treatment is used also for the plutonium fuels utilized for the fast breeder reactor (Rapsodie). An outline of the process is presented and discussed, as well as the first experimental results and the plans for a pilot plant having a capacity of 1 kg/day.

The possible use of tri-lauryl-amine in the plutonium purification cycle is now under consideration for the processing plant at La Hague. The flowsheet for this process and its performance are presented.

The possibility of vitrification is considered for the final treatment of the concentrated radioactive wastes from the Marcoule (irradiated uranium) and La Hague (irradiated uranium-molybdenum) Centers. Three possible processes are described and discussed, as well as the results obtained from the operation of the corresponding experimental units using tracers.

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